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ART. VI. — *Chemins de Fer Américains ; Historique de leur Construction ; Prix de Revient et Produit ; Mode d'Administration adopté ; Résumé de la Législation qui les régit.* Par GUILLAUME-TELL POUSSIN, ex-Major au Corps du Génie Américain, et Aide-de-Camp du Général du Génie Bernard. 4to. Paris, 1836.

WHEN we last took occasion to discuss a subject having relation to rail-roads, we labored to convince the public, that there were adequate motives for undertaking one of these great works of improvement, between the cities of Boston and Albany. The splendid results, which might be anticipated from such an undertaking, appeared worthy of exciting the efforts of the rich commonwealth of Massachusetts. But we felt then, that we were arguing to the deaf. Projects of this sort were, without ceremony, denounced as visionary ; and those who urged them with any degree of confidence were regarded, by that class of men, who place the highest estimate on their own superior judgment and prudence, not merely with distrust, but literally as persons of unsound mind. There were, it is true, many individuals, who had calmly examined the subject, and who clearly foresaw, that this great improvement was destined to produce a revolution in the habits of society. There were also great numbers, who readily listened to, and as readily believed, the splendid predictions which were daily published, of the future success of this improvement. But the great mass of sober men, — those who mutually look to one another for lessons of prudence, who fully understand the mystery of making profitable investments, and who lead the counsels of legislative bodies, in all matters relating to public revenue and expenditures, — were as incredulous of any practical benefit to result from the introduction of rail-roads, as they still are of the utility of the aeronautic labors of Mr. Durant or Mr. Lauriat. The futility of the projects which were urged upon them, by those who had taken a different view of these subjects, was so self-evident to their minds, that they deemed all demonstration, argument, or examination altogether superfluous. They boldly shut their minds against conviction, with the intrepidity of men who believe that an appeal to their understandings is but a prelude to an attack upon their pockets.

This prejudice did not prevail with equal force throughout the country. Its influence was strongest in New England. Here the triumph of this improvement has wrought its way, in opposition to the determined incredulity and apparent hostility of a great majority of that class of men, who, by the share which they hold in the wealth of the country, are most interested in its success, and who, from their general intelligence and foresight, might have been expected to be its earliest patrons. In Massachusetts, particularly, rail-roads have been successfully introduced in spite of the opposition of many who will be most benefited by them, and without the aid of such as alone could have given it without personal sacrifice. It is now proved by actual experience, that these works, when introduced with judgment, may become a source of reasonable profit to those who invest their property in them, and that their influence in promoting the public welfare is even more extensive and more striking, than the most sanguine of their advocates had ventured to predict. Throughout the country, there is now no want of confidence in the efficacy of this improvement on the public prosperity, and in general no want of disposition to patronize it. On the contrary, there is in almost every part of the country, too much ardor in pushing forward projects for these works, without sufficient consideration, and in undertaking enterprises beyond the means which can be brought to their support. The danger is that the country will suffer rather from the undertaking of too many, than too few works of this description.

We cannot admit, however, that the most ardent have formed an over-estimate of the benefits, which are to result from this new instrument of social and commercial intercourse. It will make a new era in the history of civilization. It multiplies the resources of society, by facilitating the intercourse between distant places, and still more, by enlarging the circle in which the members of the same community may act together with a concentrated effort. The distance by which towns and States are separated, is reduced by it, for all practical purposes, more than one half. The circle, within which the whole population may have a daily or hourly intercourse, is enlarged, at least, threefold, and the practical effect of this change is to leave to the population, scattered throughout this enlarged area, the advantages of their respective local positions, and to secure to them at the same time all the benefits

of a frequent and easy communication with one another, which before could have been obtained only by means of actual juxtaposition. The city of Boston, for example, possessing within her own limits about eighty thousand souls, is surrounded, within a little more than forty miles, by a population of four hundred thousand persons, engaged in various occupations for which their respective situations are adapted, with the advantages of soil, ample space, water power, and many other privileges, which could be enjoyed by them, only in their respective dispersed places of residence. By means of the four rail-roads stretching towards the four points of the compass, with their respective branches diverging in all directions, the most remote of this population, instead of being distant a day's journey, will be placed within the compass of a three hours' ride from the city, and many of them within the limits of a single hour. In other words, the advantages of vicinage to the metropolis are extended to twice the distance, and of course embrace four times the area, over which the same advantages extended, before this improvement was known. What will be the ultimate effects of this concentration, it is impossible to foresee ; but it is evident that it will give an impulse to the movements of society, which no other known cause could produce.

It having been at length demonstrated, beyond the power of contradiction, by the actual success of rail-roads already in operation, that they are destined to have an important influence on the welfare of communities, it is natural that each portion of the country should exhibit an eagerness to secure its share in the benefit. All men have discernment enough to perceive, that while the public at large are about to derive a benefit from the general introduction of this improvement, its most striking advantages are of a local character, and are to be secured only by an appropriate direction of the respective improvements. They perceive also, that there must be a limit to the number and extent of these improvements, and that in many cases, to secure the benefit to a particular tract of country, it is necessary to seize the occasion of appropriating it, before it is appropriated by more active competitors in some neighbouring region. The improvement consists in the introduction of new and improved channels for the intercourse of society. When it was first discovered that rivers were not the only channels for this intercourse, the whole country

was open for a new competition. There was a wide field for selection, in the choice of these channels. But when the selection is once made and the ground occupied, it will be obviously much more difficult to change the direction of these channels, or to introduce substitutes for them, than it would have been in the first instance, by a prudent foresight, to have given them a different direction. For this reason, a much greater degree of eagerness in the pressing of works of this description is excusable, in situations in which the immediate prospects of business seem hardly to justify it, than would otherwise be thought judicious. The great channels of business have been often formed by the mere force of a current, which was produced at first by slight and perhaps accidental causes. Cities continue to grow, not because their situation is intrinsically the most advantageous, but because they have already acquired a certain growth, which of itself contains within it the elements of further increase.

The commercial advantages of the city of New York secure to her a decided preëminence over the other ports of the Union. Her unrivalled inland navigation, — her steamboats stretching their regular and rapid voyages to Albany, to Hartford, to Providence, and even to Charleston, — her lines of packets, to Liverpool, to London, to Havre, and to many other ports, — her canals, extending the line of navigation to Lake Champlain and Lower Canada, to Lakes Ontario and Erie, and to the whole western country, — and her unlimited resources in the wealth and enterprise of her citizens, seemed destined to give her, at no remote period, a monopoly of the great foreign trade of the country. The towns of a secondary class, Philadelphia, Baltimore, Boston, and Charleston, were approaching daily the condition of provincial towns, dependent for all the principal operations of commerce on the port of New York. A great part of the domestic trade of Massachusetts had by degrees formed a direct connexion with that city. Canals were dug leading in that direction, from the counties of Hampden, and Hampshire, and even from Worcester, the very centre of the State. Boston, the metropolis formerly of New England, had almost ceased to be the commercial metropolis of her own State. The other cities of the Union were suffering under a similar influence. The whole trade of the country seemed destined to be re-

stricted to those channels, which were adapted to either steam or canal navigation.

In this state of things, rail-roads were introduced on public routes in England, and became known in this country. It was evident from the first proofs of their efficacy, as a method of travelling, that they were capable of producing a great change in the face of things; that the currents of traffic and of personal intercourse, instead of passing only through channels where water could be made to flow, might be led across mountains, and through every region enlivened by human industry; and that the prosperity of cities, instead of depending on the accident of being placed on a navigable stream, which can float its commerce to a vast interior, would hereafter depend upon the foresight and energy of their inhabitants, in forming for themselves the channels of intercourse, and in supplying them with the fruits of their industry.

These considerations serve to account for the earnestness of the early friends of rail-roads, in endeavouring to impress on the public mind a conviction of their utility and importance; and for the eagerness of the public, in undertaking these improvements, as soon as they become convinced of their utility. Under these circumstances it is not surprising, that in many instances the zeal of those who undertake these works, should far outstrip their ability to carry them into execution; or that among the many judicious projects, which promise successful results, there should be also many, which are likely to disappoint the expectations of their projectors, and still more which are impracticable and visionary.

The volume of M. Poussin, the title of which is placed at the head of this article, consists of a classification and general description of all the rail-roads which are completed, and which are in the process of construction in the United States. Had it embraced also but a brief notice of the rail-roads projected, the volume would have been swollen to a much larger size. On the list of those which are yet but projects, there are many which are destined to form an important part of the system of internal communication in the United States. But those which are completed, with those which are in rapid progress, form an ample subject for an important and interesting work. M. Poussin classifies the different works which came within the scope of his plan, under two heads; 1st, those

which form the line of the Atlantic, and 2d, those which lead from places on the Atlantic to the interior.

The works of the first of these classes are destined to form, with the addition of a few connecting links of steam navigation, a line of communication from Portland in Maine, to Wilmington in North-Carolina, a distance of nine hundred miles. Over eight hundred miles of this distance, viz. from Boston to Wilmington, as soon as the works now commenced shall be completed, the ordinary passage will probably be performed in four days, without night travelling.

The works of the second class, some of which are projected on a most magnificent scale, besides a great number of rail-roads leading from towns on the sea-board to places in the interior of the same State, or an adjoining State, embrace not less than six or seven lines of communication, from cities on the Atlantic to the navigable waters of the Western States. M. Poussin, in his work, confines himself to a description of those portions of these grand lines of communication, which are either finished or are actually commenced. To form an idea, however, of the true character of these works, and of the bearing which they are destined to have on the future prosperity of the country, it is necessary to look at them as parts of the grand system of improvement, to which they respectively belong, and to take notice of some of the parts of the system, which are not yet completed, or even in the actual process of execution. We shall, therefore, take a hasty review of the principal projected systems of improvement, taking care to distinguish those which are completed, and in actual operation, from those which are in progress, and these again, from such as are merely projected. This review, we think, will strike with some surprise those who have not carefully watched the progress of these improvements, and will show, that the country is in the way to be supplied, in the course of a very few years, with facilities of communication which will rival those of any other country.

In New England, the line of the Atlantic will begin at Portland or perhaps at Bangor, and, proceeding near the sea-coast, through Saco, Portsmouth, Newburyport, and Salem to Boston, will continue its course through Providence to Stonington, and after crossing Long Island Sound, where it is twenty-five miles in width, it is proposed to carry it along nearly the whole length of Long Island, through Jamaica to

Brooklyn, near the city of New York. This will constitute the immediate sea-coast line. But there will be others through a great part and perhaps the whole of the distance, a little farther inland, viz. from Portland through Dover, Exeter, and Haverhill to Boston, thence through Worcester to Norwich or New London, and thence by steam navigation to New York; and also from Boston through Worcester, Springfield, Hartford, and New Haven, by a connected series of rail-roads to New York. Of the series of works which will form this double and triple line of communication, along the coast of the New England States, four are already completed, viz. from Boston to Providence, from Boston to Worcester, from Boston to Andover, including a part of the Lowell rail-road, and from Brooklyn to Jamaica, making an extent of an hundred and twenty miles; and six others are commenced and in active progress, by organized joint stock companies; viz. from Providence to Stonington, from Boston to Newburyport, from Andover to Haverhill, from Worcester to Norwich, from Worcester to Springfield, and from Hartford to New Haven, making a farther extent of two hundred and twenty miles. The series will thus far be finished in the course of two or three years, and the other portions of the lines described there is reason to believe will, in great part at least, be completed at no remote period thereafter.

When these lines of rail-road are completed, the ordinary passage from Portland to Boston will be performed in about six hours, and that from Boston to New York in twelve. The projected roads, between Boston and New York, will present to the traveller a choice among three routes; one by way of Providence, Stonington, and Long Island, which will give about a hundred and ninety miles of land travel, and twenty-five of steam navigation; one by way of Worcester, Norwich, and Long Island Sound, which will give a hundred and three miles of land travel, and a hundred and twenty-five of steam navigation; and the third by way of Worcester, Springfield, and New Haven, with two hundred and twenty-five miles of land and steam, or continued land travel. The difference of time required for the three routes will not be sufficient to give either a decided precedence over the other two, to those who may take an interest in viewing the country passed through. Any one of the routes will reduce the passage

from Boston to New York, to an easy day's journey, the whole of which may be usually performed by daylight.

In proceeding southwardly from New York, we find two distinct lines of rail-road uniting that city with Philadelphia. The first of these is the Camden and Amboy rail-road, constructed with a double track, and leading from the port of South Amboy, in a southwesterly direction across the State of New Jersey, a distance of sixty miles, to Camden, on the easterly banks of the Delaware, opposite to the city of Philadelphia. The passage from New York to Amboy is made by steamboat navigation, a distance of twenty-five miles through an inland passage, which separates Staten Island from the shore of New Jersey. The passage from New York to Philadelphia is made in five and a half hours.

The other line is entirely distinct from that just described. It is of about the same length, and leads from the ferry, opposite to the city of New York, through the city of Newark, and the towns of Brunswick and Trenton, directly to the city of Philadelphia. This line consists of three distinct rail-roads united in one line; one extending from the ferry to New Brunswick, the second from New Brunswick to Trenton, and the third from Trenton to Philadelphia. The second of these roads is not yet finished; the other two are in full operation. This route will have the advantage of passing through the principal towns of New Jersey, while the other passes directly through a very barren and desolate region.

In continuing the Atlantic line from Philadelphia to Baltimore, there will also soon be a choice of several routes. That which has been hitherto chiefly travelled, is the New Castle and Frenchtown rail-road, which extends only across the peninsula from the Delaware River to Chesapeake Bay, a distance of sixteen miles, and serves as the connecting link of a chain of steamboat navigation, by which the rest of the passage is made, from Philadelphia to Baltimore. The distance by the course of the steamboat from Philadelphia to New Castle is thirty-five miles, and that from Frenchtown to Baltimore nearly double, making the whole distance from Philadelphia to Baltimore a hundred and twenty miles. The time usually occupied in making the passage is from ten to eleven hours, that part of it made by the rail-road occupying one hour.

Another distinct route, from Philadelphia to Baltimore, yet

unfinished, but a great part of it nearly ready to be put in operation, consists of three rail-roads; the first leading from Philadelphia to Wilmington in Delaware; the second leading from Wilmington by way of Elkton, to the Susquehannah River; and the third from Port Deposit, on this river, to Baltimore; the whole distance being one hundred miles. A part of this road, extending from Wilmington to Elkton, a distance of seventeen miles, has been quite recently opened. The work on the other portions of the road is far advanced, and it is anticipated that it will be opened early in the present summer. When the whole is completed, the passage upon it, between the two cities, will be performed in about six hours.

Still another route has been projected, pursuing the Columbia road from Philadelphia, a distance of forty-five miles, and diverging thence by a new rail-road from Coatsville, by Oxford, to Point Deposit, and proceeding thence to Baltimore by the route above mentioned. This route is less direct than that last described, and the distance thereon will be a hundred and twenty miles.

From Baltimore, the Atlantic line extends to Washington, a distance of thirty-eight miles. This road consists of a double track, and is identical for a distance of eight miles with the Baltimore and Ohio rail-road. It is usually travelled in about two hours and a half. Thus the whole distance from Boston to Washington is travelled, nearly in a direct course, either by rail-road cars or by steam navigation; and before the end of the present year, it is probable that the whole distance from New York to Washington, may be travelled by rail-roads, and in the space of fourteen hours.

From Washington, the Atlantic line of rail-road extends in a southerly direction, through the State of Virginia. From the city of Washington, the Potomac runs for about forty-five miles, in nearly a direct southerly course, to Potomac Creek. This part of the river is well adapted to steam navigation, and on this part of the line no rail-road has yet been commenced. A charter has been granted for a rail-road from the city of Washington, passing through Alexandria to Fredericksburgh, with the right of making a branch to Warrenton. Books have been opened for subscriptions to the stock, but the company is not yet organized. From Fredericksburgh to Richmond, the rail-road is already built and in successful operation. It is sixty-one miles in length, and it is traversed

daily by passenger cars, carrying the mail, in something less than four hours. It is proposed to extend this road from Fredericksburgh to Potomac Creek, a distance of seven miles, unless the Fredericksburgh and Washington road is immediately prosecuted, in which case the extension will be rendered unnecessary. In proceeding southwardly from Richmond to Petersburg, the rail-road line is not yet completed. A company is formed for the construction of a road, the distance being about twenty miles, and the work is considerably advanced. The want of this part of the line is the less felt, in consequence of the steamboat navigation between these two places, by the circuitous channel of the James and Appomatox rivers. The completion of the rail-road on this part of the route will materially shorten the line of travel. Between Petersburg and the Roanoke, the rail-road is already completed. This was one of the first, and it is one of the finest rail-roads in the country. It is fifty-nine miles in length, and it forms a channel for the transport of the produce of the rich valley of the Roanoke to a market at Petersburg. It is regularly traversed by locomotive engines, and the mail is daily transported upon it.

Besides the route just described, passing through Baltimore, Washington, and Richmond, to the Roanoke, and terminating near the northern border of North Carolina, there is another, called the Eastern Shore and Norfolk route. It is proposed to construct a rail-road which shall diverge from the Wilmington and Susquehannah road, near Elkton, and after proceeding in a southerly course, and nearly in a right line, over a very level country near the eastern boundary of Maryland, to Princess Ann, terminate at Tangier Sound, near the southern border of the state. The length of this rail-road will be a hundred and eighteen miles. To continue the line of communication from Tangier Sound, to Norfolk and Portsmouth, it is proposed to establish a line of steamboats, to run daily, a distance of eighty-five miles. At Portsmouth, a rail-road is already constructed, leading thence westwardly to Weldon, on the Roanoke River, near the termination of the Petersburg road, a distance of seventy-five miles. On this road a train of cars runs daily, receiving passengers who leave Halifax by stage coaches in the morning, and conveying them to Portsmouth before dinner, where they embark in the steamboats, which now run to Baltimore and Washington. By means of this

route, Norfolk shares with Petersburg in the trade of the Roanoke valley ; and, should the project of the Eastern Shore rail-road be carried into effect, this city will be placed on the shortest line of communication along the shore of the Atlantic.

At the Roanoke River terminates the Atlantic line now in operation ; but it is in a fair way to be soon extended from this point, in one direction to the centre, and in another to the southern extremity, of the State of North Carolina. A company is formed for constructing a rail-road from the termination of the Petersburg and Roanoke Rail-road, at Weldon, in a southwesterly direction through Halifax to Raleigh, a distance of eighty miles. The road is laid out, and the work upon it is in active progress. Another company is formed, called the Wilmington and Raleigh Rail-road Company, by whom a rail-road is laid out, and the work upon it begun, leading from Halifax on the Roanoke, in a southerly direction, a hundred and sixty miles, through the whole width of the State, to Wilmington. It is proposed to construct branches leading from this road to Raleigh and Fayetteville, and also a branch to Newbern and Beaufort. From Wilmington, it is proposed to continue the line of travel by steam navigation to Charleston, a distance of a hundred and sixty miles. There are also projects for extending the line of rail-road from Raleigh to Charleston, a distance of two hundred and fifty miles, or to Columbia, a hundred and eighty miles, and thence to Augusta in Georgia ; but they have not yet assumed such a shape, as to authorize any confident expectation that they will be soon carried into execution.

We proceed to notice the principal rail-roads included in the second class, the most important of which are such as form lines of communication, from the shore of the Atlantic, to the navigable waters of the Western States. The first, and one of the most important of these lines, begins at the city of Boston, passes westerly through the whole length of the State of Massachusetts, to West Stockbridge, and thence through the greatest length of the State of New York, by the way of Albany and Utica, to Buffalo, the principal port on Lake Erie, and thence by the southeasterly shore of the lake, to the town of Erie, in Pennsylvania, the whole length being about six hundred miles.

This extensive line will consist of no less than eleven distinct works, constructed by that number of independent com-

panies, each with the right of entire control over its own portion of the line, but so connected with one another, that the same engines and cars may run, if occasion should require it, from one extremity of the line to the other, with the single interruption of a ferry at Albany. Of the eleven portions of the line, three are already completed, and in full operation, embracing some of the most difficult and expensive parts of the route. Three others, embracing the remainder of the difficult parts of the work, are in progress, the whole capital deemed necessary being secured, and portions of the work under contract. The five remaining companies, having in charge parts of the line between Utica and Erie, are either recently organized, or are now engaged in completing the subscriptions to their stock. The comparatively small expense at which this western part of the line may be built, and the entire success of the Utica road, leave no doubt that this remaining portion, at least as far as Buffalo, will be completed at no remote period.

The several works which compose this line are, 1st. The Boston and Worcester Rail-road, which leads from a convenient point on the harbour of Boston, to the centre of the town of Worcester, a distance of forty-four miles. It consists at present, of a single track, but it is of sufficient width for another track, whenever it shall be found necessary. It is built of the edge rail, weighing forty pounds to a yard, supported by cast-iron chairs, on cross sleepers of cedar, which rest on a bed of stone rubble. Although it passes through a hilly country, crossing the principal streams between Boston and Worcester, with the heights of land which lie between them, and reaches an elevation, at Worcester, of four hundred and fifty feet above the level of the sea, it has no ascent greater than thirty feet in a mile, and has little curvature, except in the city of Boston near its termination, of less radius than 2000 feet. The cost of this road, including the extensive buildings and depôts in Boston and Worcester, and the intermediate towns, with a liberal supply of locomotive engines and cars, was a million and a half of dollars. The time usually occupied in making the passage from Boston to Worcester is three hours, including the time lost in stopping at ten intermediate places, for receiving and discharging passengers. It has been found by experiment, that the passage may be easily made in two and a half hours, by a slight

increase of speed, and by curtailing the periods of stopping ; but a regard for the convenience and comfort of the passengers has led to the adoption of the rate of travelling above mentioned, viz. fifteen miles an hour, including the time lost in stopping once in every four miles. It is also found by experience, on this road as well as on the Providence and Lowell Rail-roads, that twenty miles an hour, without including stops, is a safe rate of travelling, agreeable in its effect on the passengers, and easily maintained by the engines in use on all these roads. A much swifter rate is practicable, but it is hardly consistent with a regard for the safety of the passengers. From these facts it may be assumed, that on a long line of well-constructed rail-roads, on which the long travel is sufficient to justify the maintenance of passenger trains running through the line, without frequent stops for the accommodation of the way travel, the usual speed will be nearly equal to twenty miles an hour, or at least a hundred miles in six hours. At this rate, the passage will be made from Boston to Albany in twelve hours, and from Boston to Buffalo, or Niagara, in thirty hours, or in two days, in the summer season, travelling by daylight only.

The second link in this chain of communication is the Western Rail-road, extending from Worcester through Springfield, to the line of the State of New-York, at West Stockbridge. For the construction of this road, an incorporated company is formed, with a capital of three millions of dollars, of which one million is subscribed by the State of Massachusetts. The conditions of this subscription are, that assessments shall be paid on the stock belonging to the State, in the same proportion as they are levied on that belonging to individuals, and three of the nine directors are appointed by the legislature. Three assessments, amounting to \$450,000, have been paid. A part of the road, extending twenty miles west from Worcester across the highlands, which have been denominated the backbone of the State, has been put under contract for the grading and masonry. It is understood that some parts of the line, in crossing the highlands, will be formed with an inclination of forty feet in a mile. The rest of the line along the valley of the Chickopee River, to a point near Springfield, is comparatively easy of construction, and will be formed on a gradual and almost uniform descent. This part of the route is in readiness to be put under contract, and it is

presumed the work will be in progress throughout the line, early in the present season. The length of the line from Worcester to Springfield is fifty-four miles, and from Boston to Springfield, ninety-eight miles. Investigations and surveys have been industriously prosecuted, on various routes from Springfield to West Stockbridge, preparatory to an early location of that part of the line. A considerable portion of the route being yet undetermined, it is not possible to say what will be the precise length of the line, but it may be assumed at not far from sixty-two miles. For the same reason, no precise estimate of the cost of the whole road can yet be made ; but as a great part of the line will follow the channels of the two principal streams, and as the whole line will probably conform more nearly with the natural surface of the ground, than the Boston and Worcester road, on which there is much deep excavation, frequently through rock, it may be fairly presumed that the cost will be less in proportion to its length, than that of the latter road. It will also be exempt from the high charges for land and damages, to which the latter was subjected in and near the metropolis. From these considerations it may be presumed, that the amount of capital already secured will be sufficient for the completion of the work.

The third link in the chain consists of the Albany and West Stockbridge Rail-road. This is already in progress, by a company formed at Albany, under a charter from the legislature of New York. It has a capital of \$650,000, of which \$250,000 are subscribed by the City of Albany, in its corporate capacity. This fact shows the deep interest which the citizens of that town take in the opening of this new channel of communication with the county of Berkshire, and with the whole of Massachusetts and the other New England States. The business transactions now carried on between the county of Berkshire and the ports of the Hudson River, are very extensive ; and it is reasonable to anticipate that they will be much increased by the facilities which this work will afford. In reliance upon the extent of this business, the people of the city of Hudson have also undertaken the construction of a rail-road, leading directly from that city to West Stockbridge, and to be united with the Western Rail-road, near its junction with the Albany road. These two roads will thus give to the travel and trade from Massachusetts a double outlet to the Hudson River. The directors of the Albany road, after a

thorough examination of a number of routes, one of which followed for some miles the course of the Hudson road, finally selected one leading through New Lebanon, which reaches Greenbush, on the eastern bank of the Hudson, opposite to the city of Albany, in a distance of forty-one miles and three quarters. This route has no descent or ascent greater than forty feet in a mile, and no curve of less radius than a thousand feet. This distance, added to the probable length of the two roads in Massachusetts, will make the whole distance from Boston to Albany about two hundred miles.

The next section of the line, in proceeding westward from Albany, consists of the Hudson and Mohawk Rail-road, which terminates at Schenectady, a distance of sixteen miles. This road was built several years since, with two tracks, at a cost of \$1,100,000, amounting to nearly \$70,000 a mile. The greater part of this road is made either level, or with planes of moderate inclination. It has, however, two planes, one near Albany of a thousand yards in length, and the other near Schenectady of near seven hundred yards, each of which inclines from a level, at the rate of one eighteenth, and each requiring a stationary steam-engine to enable the trains to traverse them. These two inclined planes subject the company to an extra expense of twelve thousand dollars a year. Notwithstanding the heavy expense of this road, and these disadvantages of location, it is a productive property to the proprietors, though, on account of its heavy cost, not equal in value to the anticipations of its projectors.

The next section, extending from Schenectady to Utica, a distance of seventy-seven miles, was opened on the 1st of August last, under more flattering auspices. It was built, with a single track, in a comparatively short period of time, and at a cost, including eight locomotive engines, and embracing a heavy expenditure for the purchase of land, and for damages to a turnpike company, not exceeding a million and a half of dollars, or about \$20,000 a mile. On the celebration of the opening above alluded to, four hundred gentlemen left Albany, in eighteen cars, drawn by two locomotive engines, and, after passing over the Mohawk road, and stopping occasionally along the Utica road to receive the congratulations of its friends, reached Utica for dinner. After dinner they returned to Schenectady in less than four hours, and, deducting the aggregate of the stops, in three hours and twenty-one minutes, being a

rate of twenty-three miles an hour. They then proceeded to Albany, where they arrived about sunset, having completed a journey of one hundred and eighty-eight miles within the day, and devoted some hours to the festivities of the occasion. From the date of the opening, two trains of cars, drawn by locomotives, have left each end of the road daily, one in the morning and the other at noon. The receipts, within the two months from the opening, amounted to an average of near \$1200 daily. This was from the fare of passengers only, the company being forbidden by their charter to carry freight, except in winter, lest it should detract from the income of the Erie Canal, which runs parallel to it, and is the property of the State.

The next section of the line extends from Utica to Syracuse, a distance of fifty-four miles. A company has been formed for the construction of this road with a capital of \$800,000; but we do not learn whether they have made any progress in the execution of the work. The route is entirely level, the canal between the two towns being constructed without a single lock. A company is also formed with a capital of \$650,000, to construct a rail-road from Utica to Oswego, a port from which steamboats regularly take their departure from the principal ports on the lake, and from which there is a continued navigation, through the Welland Canal, to Lake Erie and the upper lakes. The next succeeding section of the great western line extends from Syracuse to Auburn, a distance of twenty-six miles. The maximum of inclination is thirty feet in a mile, and there is no curvature of a less radius than fifteen hundred feet. The construction of this road was some time since commenced, by a company with a capital of \$400,000, more than half of which has been already expended on the work. The rails are contracted for, to be delivered in May next, by which time it is anticipated the grading and masonry of the road will be completed. The eighth section of the line extends from Auburn, by way of Geneva and Canandaigua, a circuitous course, to Rochester, a distance of seventy miles. The cost of this road is estimated by the engineer at \$820,000 if built with a single track, and \$1,013,000 if with a double track. The stock of the company is taken up, to the amount of \$1,200,000, and they have a right by their charter to increase it to \$2,000,000. The two next sections extend from Rochester to Attica, and from Attica to

Buffalo. Companies are organized for the construction of these two roads, but their progress hitherto is limited to the making of the surveys. The route is not difficult or expensive. On the Attica and Buffalo section the greatest inclination will be thirty-five feet in a mile. A company is formed for the construction of the rail-road from Buffalo to Erie, with a capital of \$650,000, the whole of which is subscribed.

We have been thus particular in the description of this line of rail-roads, on account of the effect it is destined to have on the interests of the East and the West. It opens a channel by which the currents of moving population and the tide of commerce may flow backward and forward, between the manufacturing States of the East and the agricultural regions of the West, in place of a mountain barrier, which has hitherto turned the course of both towards the ports of the Atlantic. It is easy to foresee that the benefits, which must result from it, to the inhabitants at each extremity, must be of the most striking character. Whether we regard it as merely opening new sources of wealth, or as extending the means of social intercourse, and strengthening the bonds of union between distant States, we cannot place too high an estimate upon its advantages. Some of the other lines of communication promise similar results to the tracts of country which they are intended to serve. But we shall be obliged to despatch them with a more cursory notice.

The next line of rail-road from the Atlantic to the Western States, is the New York and Erie Rail-road. This road will commence at Tappan on the western shore of the Hudson River, twenty-four miles from the city of New York, and, after running northwesterly and westerly, within the State of New York, near the northern boundary of New Jersey and Pennsylvania, a distance of near five hundred miles, it will terminate at Dunkirk, a port on Lake Erie. It is estimated that this road will cost six millions of dollars. A capital of \$1,800,000 has been subscribed by individuals, and the legislature of New York has engaged to make a loan of \$3,000,000, certain portions of which are to be advanced on the completion of specified portions of the road ; the last million not to be paid, until the whole road, with a double track, shall be completed. Books are opened to increase the subscription of capital to \$3,000,000. In anticipation of the advantages which will result from the enterprise to the proprietors of real estate at

the western termination of the route, and at other places west of the Genesee River, large donations of land have been made to the company, which are valued at one or two millions of dollars. These donations have enabled the company to offer to those who now are, or who may become subscribers to the stock, six per cent. per annum until the year 1841, on all sums which shall be called in on their respective subscriptions, up to that time, to be provided by sales, as far as shall be necessary, of these lands. This offer has been made with the further proviso, that the residue of the lands, which shall be unsold in 1841, shall be divided among the holders, at that time, of the three millions of stock. It is anticipated that by that time the work will be so far completed, as to admit of an income being derived from the road itself. This is a magnificent project, which must be productive of important results, in increasing the business of the city of New York, and in giving a new accessible frontier, along the whole length of the State, and thereby producing a vast accumulation of valuable property within its limits. Should it far exceed the estimate which has been made of the cost, these advantages will fully justify the expenditure.

On proceeding southwardly to Philadelphia, we meet a third projected system of Western rail-roads, leading from that city to the Ohio River, and Lake Erie. There are already completed and in full operation in Pennsylvania, eight hundred and eighty-six miles of canal, and three hundred miles of rail-road; a part of which is the property of the State, and the rest the property of incorporated companies. There are in the process of construction, three hundred and five miles of canal, and four hundred miles of rail-road, and there are besides many works projected of both descriptions, which are not yet commenced. Among the works completed are a line consisting partly of rail-road, and partly of canal, belonging to the State, leading from Philadelphia to Pittsburgh. This line of works, though of great utility, does not admit of that rapidity of communication which is found desirable, and which is afforded by a continued line of rail-roads. The public attention has therefore been lately directed to the importance of a continued rail-road, leading not only to the Ohio River at Pittsburgh, but to Lake Erie. No definite route, however, has yet been designated for this road, and no plan is matured for the construction of it in its whole extent. It is proposed that it

shall consist in part of some of the works already constructed. The principal of these is the Columbia Rail-road, which extends from Philadelphia to Columbia, a distance of eighty miles, and is constructed with a double track. A branch diverging from this road at Lancaster, and extending to Harrisburgh, the seat of government of the State, is nearly finished. A bill is now before the legislature for authorizing a further extension of this line from Harrisburgh to Sunbury, and it is proposed to make a still further extension from Sunbury to Williamsport. A convention of delegates from the counties of the State was lately held at Northumberland, which recommended an application to the legislature for the incorporation of a company with adequate capital, to construct a rail-road from Lake Erie, by way of Williamsport, to Sunbury, thus completing the line to Philadelphia. Various other measures have been adopted, which show a strong direction of the public mind towards the attainment of the main object, in the manner which shall be found on investigation to be the best. Some of the projects recommended tend towards the town of Erie, as the point of western termination, and others, towards Cleaveland in Ohio, by way of Pittsburgh and Beaver. It is, perhaps, safe to infer, that, considering the ample means for the attainment of this object, possessed by the people of this great State, and the stimulus which their patriotism is likely to receive, from witnessing the continued progress of the New York and Erie road on their northern border, and tending to divert a portion of the business of the West from their own capital, these projects will not be suffered to remain unexecuted. The mineral treasures of the State are alone sufficient, in many places, to support these works as mere local improvements, for rendering the mines accessible. In this respect the mountainous regions of Pennsylvania possess a decided advantage over those of New England.

The next line of rail-road leading from the Atlantic to the waters of the West, is the Baltimore and Ohio Rail-road. This may be considered the pioneer rail-road of the country. It was not only the first which attempted to traverse the Alleghany, but it was the first rail-road of any magnitude attempted in the United States. We have heretofore fully noticed the early history and progress of this enterprise. It has met with impediments to the attainment of its main object, the crossing of the mountains, of a most vexatious and embarrassing char-

acter, from coming in conflict with a rival improvement, the Chesapeake and Ohio Canal, which had preoccupied the only channel through which it could pass. These impediments are at length removed, by an adjustment, by which both works will pass side by side, through the same channel, at a considerably increased cost to the rail-road. In the mean time, the directors of this road have learned much, from their own experience, as well as from other sources, respecting the best methods of laying out, constructing, and managing a work of this description. From this experience, and from improvements made by their officers, the country has derived great benefit. They can now proceed in the extension of their road towards the east, to much greater advantage, than they could have done six or eight years ago. Several points in the science of rail-roads, which were then either unknown, or not generally admitted, are now considered as settled axioms. Such are the following ; slight deviations from a level, in the surface of the road, are not to be regarded as serious defects, as they afford an advantage, in many situations, in the draining of the road, sufficient to counterbalance the slight evil arising from the inequality of draft, required on the ascending and the level or descending portions of the road. Short curves are defects of a more serious nature, than they were esteemed by the engineers who laid out the Baltimore and Ohio Rail-road ; and even a slight degree of curvature, although it may not be sensibly felt in the motion of the train, tends to increase the wear of wheels and axles. Much steeper inclinations can be advantageously traversed by locomotive power, than was formerly thought practicable. This fact has been satisfactorily established, by experiments made on the Baltimore and Ohio Rail-road, and by experience elsewhere. It results from this discovery that inclined planes, with stationary power, may be dispensed with on many routes, where formerly they would have been deemed indispensable ; yet the limit to which this principle may be carried remains to be tested by experience. Locomotive engines are found to be so decidedly superior as a motive power, for the transport of either freight or passengers, that the use of horses must be entirely superseded by them, on all works of any magnitude. They are cheaper, less hazardous, more manageable, and injure the road less. The iron edge rail resting on cross sleepers, is preferable to the flat rail laid on a continuous support of either iron or wood.

These and certain other truths, which could be learned only from experience, had they been known before the commencement of the Baltimore and Ohio Rail-road, would have enabled the enterprising projectors of that road to make a great saving in some of their items of expenditure.

The Baltimore and Ohio Rail-road is completed with a double track from Baltimore to Harper's Ferry, with a branch to Fredericktown, at a cost of \$3,474,600. There is, besides, a branch diverging from it at a point eight miles distant from Baltimore, to Washington, built at the additional cost of \$1,588,899. This branch last year produced a net income of five per cent., exclusive of a fifth part of the whole receipts from passengers, reserved as a bonus to the State. From Harper's Ferry a rail-road has been built, by an independent company, extending to Winchester in Virginia. This road is connected with the Baltimore and Ohio Rail-road, by a continuous track, by means of a viaduct across the Potomac River, which has just been opened for the passage of locomotives and cars. Surveys have been made for the extension of the Winchester Rail-road as far as Staunton, which when completed will form a rail-road route from Baltimore, of two hundred and fifteen miles in length. Surveys have been industriously prosecuted, within the last two years, for the extension of the Baltimore and Ohio rail-road, along the valley of the Potomac, in conjunction with the canal, and to the summit of the Alleghany Mountains, with a view of continuing them thence to both Pittsburgh and Wheeling. The engineers report with confidence, that the mountains between Cumberland and the Western waters can be passed, without the use of stationary power, by locomotive engines and their trains. The company has obtained, by virtue of acts of the legislature of Maryland and of the city council of Baltimore, subscriptions to their stock, to the amount of three millions of dollars on account of the State, and an equal sum on account of the city. With these liberal additions to their capital stock, and with such aid as may be anticipated from the citizens of Pittsburgh and Wheeling, there is reason to believe that ample means will be provided for the completion of the enterprise. No definite location of the route has been made, and consequently neither its length has been ascertained, nor its cost accurately estimated. The completion of the road is a very important end to be attained, not only to the individual stockholders, but

to the city of Baltimore and the State ; for they are deeply interested in the income of the road, and in the effects it is expected to produce on the business of the city and State. The work, as it is at present situated, is but an insignificant fragment of the whole, and it must remain, until finished, comparatively unproductive. Unlike the first western line heretofore described, it passes through no dense population which can give it an adequate support, independently of that on which it will ultimately rest, the traffic and population of the western country.

Another Trans-Alleghanic rail-road is projected in Virginia. It has two terminations on the Atlantic, one at Richmond, and the other at Norfolk. From these, two lines proceed, one towards the sources of the James River, by way of Farmville and Lynchburgh, and the other by the valley of the Roanoke. The last-named branch is to consist of the Portsmouth and Roanoke Rail-road, already described, the Greenville and Roanoke Rail-road, extending to Danville, a distance of one hundred and seventy-two miles, and the Danville and Junction Rail-road to Evansham, one hundred and thirty-seven miles in length. At some point between Danville and Evansham the two lines will probably unite, and will proceed to near the source of the Holston River, and, pursuing the channel of this stream to near the southwestern corner of the State, will pass into Tennessee, and terminate on the navigable waters of Tennessee River. From Lynchburgh, across the Blue Ridge, the Alleghany Ridge, and the ridge between New River and the Holston, two surveys have been made, by direction of the Lynchburgh and Tennessee Rail-road Company, and the cost is estimated at \$14,000 a mile. A survey of the other route has been made, and the cost of the two roads, from the termination of the Portsmouth and Roanoke road, to Evansham, is estimated at \$5,254,000. Both routes are pronounced by the engineers practicable for locomotive engines. The legislature of Virginia has granted to the James River and Roanoke Company the right to construct a rail-road from Richmond to Lynchburgh ; and that company has voted to construct it, as soon as the Lynchburgh and Tennessee Rail-road shall have been commenced, and has instructed the directors, in that event, to open books of subscription for the necessary stock. It is anticipated that the Lynchburgh and Tennessee Rail-road will unite, near its south-

western termination with the Charleston and Cincinnati Railroad, and thus enable the State of Virginia to share in the benefits of that great work. It is proposed also that it shall unite with the line of steam navigation on the Tennessee River, which, with the exception of the interruption by the Muscle Shoals, extends to the Mississippi. To supply the chasm in the line of communication, occasioned by the interruption of navigation at these shoals, a rail-road was constructed and put in operation two years ago by a company formed under a charter from the legislature of Alabama. This was the first rail-road, with the exception of one near New Orleans, in the Western States. It extends from Tuscumbia, a port situated below the Muscle Shoals, to Courtland, and thence to Decatur, at a part of the river above the Shoals, the length of road being forty-three miles. A project has been discussed in Tennessee, and countenanced by a convention of delegates held at Nashville, for establishing a central rail-road, leading through the State from the Virginia line, to the Mississippi River ; but no definitive measures have been taken for carrying it into effect.

In a similar spirit of local patriotism, and with an ardent desire for improving the condition of their State, the people of North Carolina have projected a line of rail-roads, to be connected with the roads from Edenton and Beaufort, from Wilmington, and from Halifax and Raleigh, at Fayetteville, and to proceed thence in a northwesterly direction, by the Yadkin River, to unite with the Charleston and Cincinnati Railroad, near the northwestern angle of the State. All these roads are projected by private companies incorporated by the State. By a late act of the legislature, the chief part of the surplus of United States revenue which falls to that State is appropriated to a fund for internal improvements, and the commissioners of the fund are instructed to subscribe to the stock of these companies, to the amount of two fifths of their respective capitals, provided the other three fifths shall be subscribed by responsible persons ; no payment to be made on the part of the State, until a quarter part of the stock subscribed by individuals shall have been paid in. In all the lower parts of the State the face of the country is remarkably adapted to the favorable location of the respective routes, and for the cheap grading of the roads. In the northwest the route has not been fully surveyed.

We come next to the grand Charleston and Cincinnati Rail-road. This is one of the boldest projects of modern times, and it has been engaged in by the people of Charleston and of South Carolina, with an ardor which shows a determination to carry it into effect. It is magnificent in its extent, and, independently of its magnitude, it will be attended with difficulties in the execution, which will require the exertion of great skill and energy, and a very great expenditure of money. We are far, however, from supposing the enterprise in its nature impracticable, or that it is likely to fail from any cause, unless it be from the failure of the necessary means. Even these can hardly fail, if the other States interested in its success imitate the example of South Carolina, and contribute their fair proportion to the expenses of the undertaking. A company has been formed, and incorporated by joint acts of the legislatures of the four States through which the route passes, viz. North and South Carolina, Tennessee, and Kentucky, with all the powers necessary for accomplishing the work. The capital is \$12,000,000, and by a supplementary charter, the company is authorized to raise an additional capital, to be employed in banking, not to exceed at any time the amount actually raised for the road. The route is definitively established so far as to adopt the valley of the French Broad River, in North Carolina and Tennessee, as a part of it. This valley presents a most remarkable pass through the mountain, for a great extent. The head waters of this stream rise in an extensive plain on the Blue Ridge, from which there is a descent for sixty miles, in the direction best suited for the rail-road, not exceeding an average of thirteen feet in a mile, and not exceeding forty-five feet in any mile, and with no curvatures, but such as locomotives and their trains may pass without difficulty. Other parts of the route are no further definitively settled than that it shall pass through Columbia in South Carolina, Knoxville in Tennessee, and Lexington in Kentucky. Surveys have been made, which enable Governor Hayne, the president of the company, to state, "that the proposed route is entirely practicable, and may certainly be constructed across the mountains, with an ascent at the maximum of not more than sixty feet in any one mile, and without a single inclined plane, or stationary engine." The distance will be from six to seven hundred miles. It will probably pursue the route, from Charleston to

Columbia, selected by the South Carolina Canal and Rail-road Company, on which they have already constructed a rail-road half the distance, with a single track. A negotiation has been opened between the two companies for settling the terms, by which a junction shall be formed between the two roads. The amount of capital stock already subscribed is \$4,333,000, of which \$3,525,000 are subscribed in South Carolina. On this stock \$216,660 have been already paid in. Measures are taken for an immediate prosecution of the surveys, and for the advancement of the work as expeditiously as possible.

The State of Georgia has undertaken a series of rail-road improvements, traversing the whole length of that great State, from the eastern parts to the Chatahouchee River, and the Tennessee line, hardly less extensive than those of South Carolina. The policy of this State seems to have been, to grant to private corporations the right of constructing rail-roads in the eastern, more settled, and less expensive parts of the State, with such encouragements as are necessary to enable them to proceed with these works, and to undertake, on account of the State, such works in the newly-settled and more difficult parts of its territory, as are necessary for extending the lines of communication, until they shall meet others beyond the limits of the State. The legislature accordingly, at its last session, passed an act directing that "a rail-road communication as a State work and with the funds of the State, shall be made from some point on the Tennessee line near the Tennessee River, commencing at or near Rossville, in the most direct and practicable route, to some point on the southeastern branch of the Chatahouchee River, which shall be most eligible for an extension of branch rail-roads, thence to Athens, Madison, Milledgeville, Forsyth, and Columbus, and to any points which may be designated by the engineer or engineers surveying the same, as most proper and practicable, and on which the legislature may hereafter determine." The act further provides that no more than \$350,000 annually shall be appropriated to the prosecution of this work, unless a future legislature shall otherwise direct. It also provides that the governor shall forthwith appoint an engineer, with such assistants as shall be necessary to accomplish speedily and effectually the proper surveys and estimates, and appropriates sixty thousand dollars for the payment of salaries and expenses. The governor, in pursuance of the authority given him, has already appointed a

chief engineer, and evinced his determination to prosecute the work with all practicable expedition. In the mean time, the works of private companies are advancing, with various degrees of energy, to meet the points indicated in the acts above cited. The Georgia Rail-road and Banking Company has begun its line of rail-road at the city of Augusta, with what is called the Union Rail-road, extending westward from that city. A distance of seventy-six miles is under contract for the grading, besides a branch of seven miles in length to Greensborough, and part of a branch to Athens. Fifty miles on the line from Augusta are ready for laying the rails, and the iron is ready at Augusta and Savannah. In a similar spirit, though not so much in advance, the Central Rail-road and Banking Company are prosecuting their work, to connect the city of Savannah with another of the points named for the termination of the State work, near the town of Macon. The selection of the line of the State work is made with special reference to its connexion with a system of works in Tennessee. It is to terminate on the Tennessee line, five miles from Ross's Landing, on the Mississippi River, to which point it will be extended by the Hiwassee Rail-road Company, incorporated in Tennessee, already organized, and waiting only for the movements of Georgia. It will thus have access, through the navigation of the Tennessee River and its tributaries, to the trade of East Tennessee, and a part of North Carolina and Western Virginia, and to the Charleston and Cincinnati Rail-road, the right of doing which is reserved by the legislature of Tennessee, in its act of concurrence in the incorporation of the company for establishing that road.

These are the great lines of rail-road communication which are projected, and most of which are in active progress, for uniting the East and the West, for traversing that supposed eternal barrier, by which nature had separated them, and bringing the commerce of the Mississippi valley, in direct lines, to the shores of the Atlantic. Two others are projected, to unite the ports of the Atlantic with those of the Gulf of Mexico, one leading from Brunswick, in Georgia, to the Appalachicola River, and the other from Jacksonville, on the St. Johns, to St. Marks. The latter, called the East Florida Rail-road, is actually located, in nearly a direct line, over a level country, the distance being a hundred and sixty miles.

We must defer to another occasion some notice of the ex-

tensive works which are projected and in progress for extending the intercourse between the Western States, and of some of the almost innumerable works which occupy the attention of the people of nearly every State. We cannot close this notice, without offering our testimony to the very creditable manner in which M. Poussin has executed this first History of the Rail-roads of America. It embraces not only the history, but a full and satisfactory description, evidently founded on the most authentic documents, of the principal works which form the subject of his volume. We hope that he will follow up the progress of these improvements, and thus furnish not only to France and Europe, but to our own countrymen, the best evidences of American perseverance and enterprise.

ART. VII. — *The Great Metropolis.* By the Author of "Random Recollections of the Lords and Commons."
2 vols. 12mo. New York ; Saunders and Otley. 1837.

"ANY amusement which is innocent," says Paley, "is better than none ; as the writing of a book, the building of a house, the laying out of a garden, the digging of a fish-pond, even the raising of a cucumber." If these are all the pastimes which the author of "*The Great Metropolis*" has within his reach, our opinion is, that, when he is next in want of innocent amusement, he had better raise a cucumber. His "*Random Recollections*" we have never seen. We rest our opinion on the book before us. There is a coarseness and vulgarity in its style, which is repulsive. No strength ; no dignity ; no grace ; no refinement. In a word, the book has very bad manners. In reading it, you feel that you are walking through London, with a man who wears a "shocking bad hat" ; and when your walk is at an end, though you cannot but thank him for the information he has given you, nevertheless you commend him in future to the raising of cucumbers, or the digging of fish-ponds ; for you see, that he is "of the earth, earthy."

To us, however, the title of the book is attractive. We have an affection for a great city. We feel safe in the neighbourhood of man, and enjoy "the sweet security of streets."